

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/12/2008 has been entered. Claims 1, 5, 8, 11, 12, 15-22, and 29-35 are allowed in the present application.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Jacques L. Etkowicz on 02/13/2009.

3. The application has been amended as follows:

IN THE CLAIMS

8. (cancelled)

11. (cancelled)

12. (currently amended) A radio communication apparatus according to ~~claim 8~~ claim 35, characterized in that the moving status information is a counter value of a movable counter that counts a specified number of super frames or a flag.

21. (currently amended) A radio communication apparatus according to ~~claim 8~~ claim 35, characterized in that the moving status information further includes movement destination slot position information indicating the planned beacon slot movement destination of the radio communication apparatus, and when there is an empty beacon slot other than beacon slots designated by the movement destination slot position information of the other radio communication apparatuses that transmit beacons during the time from the beacon slot of the radio communication apparatus in question until the end of the beacon period, the beacon slot position control section records moving status information, that the empty beacon slot is planned as the beacon slot movement destination, of the radio communication apparatus in the recording section and sets the specified count in the movable counter, and the frame forming section forms a beacon frame including the moving status information of the radio communication apparatus recorded in the recording section.

29. (Currently Amended) A radio communication method wherein a first radio communication apparatus transmits a first beacon and receives a plurality of other beacons within a beacon period, said method comprising:

a step of receiving a second beacon from a second radio communication apparatus, said second beacon comprising second beacon transmitter information and second beacon period

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occupancy information,

wherein the second beacon transmitter information includes an identifier that specifies the second radio communication apparatus, and second moving status information indicating whether or not the second radio communication apparatus plans to move its beacon slot position; and

wherein the second beacon period occupancy information includes a beacon slot position that is a beacon transmission period of a third beacon transmitted from a third radio communication apparatus and received by the second radio communication apparatus, an identifier that specifies the third radio communication apparatus, and third moving status information indicating whether or not the third radio communication apparatus plans to move its beacon slot position;

a step of detecting whether there exists an empty beacon slot within the beacon period which is located before the first radio communication apparatus's beacon slot position that is a first beacon transmission period of the first beacon, ~~by using the second beacon transmitter information and the second beacon period occupancy information included in the received second beacon;~~

a step of producing first beacon transmitter information, when an empty beacon slot is detected in the detection step, said first beacon transmitter information including an identifier that specifies the first radio communication apparatus, and the first moving status information indicating that the first radio communication apparatus plans to move its beacon slot position;

a step of transmitting the first beacon at a first beacon slot position, the first beacon including first beacon period occupancy information generated by using the second beacon

transmitter information; and

a step of monitoring a specified number of super frames to confirm that the detected empty beacon slot is available, when the empty beacon slot is detected, each super frame including a beacon frame and a data frame,

wherein the empty beacon slot is confirmed to be available when, in each of the specified number of super frames after detection of the empty beacon slot and transmission of the first beacon:

i) a fourth beacon transmitted by a fourth radio communication apparatus programmed to move its beacon slot position is not received later than the First beacon slot position within the beacon period and earlier than the end of the beacon period, and

ii) transmission of the fourth beacon from the fourth radio communication apparatus programmed to move its beacon slot position is not detected in a fifth beacon transmitted by a fifth radio communication apparatus to have the fourth beacon later in the beacon period than the first radio communication apparatus beacon; and

a step of relocating the beacon slot position of the first radio communication apparatus to the detected empty beacon slot after the specified number of super frames when the empty beacon slot is confirmed to be available.

30. (Currently Amended) A first radio communication apparatus, comprising:
a radio processing section that receives a second beacon from a second radio

communication apparatus, including: radio processing section that receives a second beacon from a second radio communication apparatus, including: second beacon transmitter information including ~~a beacon slot position of the second radio communication apparatus that transmitted a second beacon received by a radio communication apparatus~~; an identifier for identifying the second radio communication apparatus, and second moving status information indicating whether or not the second radio communication apparatus moves its beacon slot position; and

second beacon period occupancy information including a beacon slot position of the third radio communication apparatus that transmitted a third beacon received by the second radio communication apparatus, an identifier for identifying the third radio communication apparatus, and third moving status information indicating whether or not the third radio communication apparatus moves its beacon slot position;

a beacon slot position control section that detects whether there exists an empty beacon slot, within the beacon period, which is located before the first radio communication apparatus's beacon slot position that is a transmission period of the first beacon, and when the empty beacon slot is detected, relocates its beacon slot position to the detected empty beacon slot;

a frame forming section that generates the first beacon including the first beacon period occupancy information generated by using the second beacon transmitter information, and a first transmitter information generated based on a detection result at the beacon slot position control section, and forms a beacon frame, wherein the first transmitter information includes an identifier that specifies the first radio communication apparatus, and first moving status information indicating whether or not the first radio communication apparatus plans to move its beacon slot position; and

a beacon transmission command section that detects the first radio communication apparatus's beacon slot position in the beacon period and indicates to the frame forming section a timing for transmitting the generated first beacon,

wherein, when the empty beacon slot is detected by the beacon slot position control section, the beacon slot position control section further monitors a specified number of super frames to confirm that the detected empty beacon slot is available, each super frame including the beacon frame and data frame,

wherein the empty beacon slot is confirmed to be available when, in each of the specified number of super frames after detection of the empty beacon slot and transmission of the first beacon:

i) a fourth beacon transmitted by a fourth radio communication apparatus programmed to move its beacon slot position is not received later than the first beacon slot within the beacon period and earlier than the end of the beacon period, and

ii) transmission of the fourth beacon from the fourth radio communication apparatus programmed to move its beacon slot position is not detected in a fifth beacon occupancy information included in a fifth beacon transmitted by a fifth radio communication apparatus to have the fourth beacon later in the beacon period than the first radio communication apparatus;

wherein the first radio communication apparatus relocates its beacon slot position to the detected empty beacon slot, and notifies the beacon transmission command section of an update of the timing for the transmitting the first beacon; and

wherein a beacon transmission command section gives the frame forming section an updated timing for transmitting the generated first beacon, and the frame forming section outputs the generated first beacon to the radio processing section according to the updated timing.

31. (Currently Amended) A radio communication method wherein a first radio communication apparatus transmits a first beacon and receives a plurality of other beacons within a beacon period, said method comprising:

a step of detecting whether there exists an empty beacon slot within the beacon period, which is located before the first radio communication apparatus's beacon slot position that is a transmission period of the first beacon, ~~by using a second beacon including a second beacon transmitter information and a second beacon period occupancy information, said second beacon is received from a second radio communication apparatus;~~

a step of producing first beacon transmitter information, when the empty beacon slot is detected in the detection step, said first beacon transmitter information including an identifier that specifies the first radio communication apparatus, and first moving status information indicating that the first radio communication apparatus plans to move its beacon slot position;

a step of transmitting the first beacon at a first beacon slot position, the first beacon including the first beacon transmitter information and first beacon occupancy information generated by using the second beacon transmitter information; and

a step of monitoring a specified number of super frames to confirm that the detected empty beacon slot is available, when the empty beacon slot is detected, each super frame including a beacon frame and a data frame,

wherein the empty beacon slot is confirmed to be available when, in each of the specified number of super frames after detection of the empty beacon slot and transmission of the first beacon;

i) a fourth beacon transmitted by a fourth radio communication apparatus programmed to move its beacon slot position is not received later than the first beacon slot position within the beacon period and earlier than the end of the beacon period, and

ii) transmission of the fourth beacon from the fourth radio communication apparatus programmed to move its beacon slot position is not detected in a fifth beacon transmitted by a fifth radio communication apparatus to have the fourth beacon later in the beacon period than the first radio communication apparatus beacon; and

a step of relocating the beacon slot position of the first radio communication apparatus to the detected empty beacon slot after the specified number of super frames when the empty beacon slot is confirmed to be available.

33. (Currently Amended) A first radio communication apparatus which transmits a first beacon and receives a plurality of other beacons within a beacon period, said radio communication apparatus comprising:

a radio processing section that receives a second beacon from a second radio communication apparatus, said second beacon including a second beacon transmitter information and a second beacon period occupancy information;

a beacon slot position control section that detects whether there exists an empty beacon slot, within the beacon period, which is located before the first radio communication apparatus's beacon slot position that is a transmission period of the first beacon, and when the empty beacon slot is detected, relocates its beacon slot position to the detected empty beacon slot;

a frame forming section that generates the first beacon including a first beacon period occupancy information generated by using the second beacon transmitter information, and a first transmitter information generated based on a detection result at the beacon slot position control section, and forms a beacon frame, wherein the first transmitter information includes an identifier that specifies the first radio communication apparatus, and first moving status information indicating whether or not the first radio communication apparatus plans to move its beacon slot position; and

a beacon transmission command section that detects the first radio communication apparatus's beacon slot position in the beacon period and indicates to the frame forming section a timing for transmitting the generated first beacon;

wherein, when the empty beacon slot is detected by the beacon slot position control section, the beacon slot position control section further monitors a specified number of super frames to confirm that the detected empty beacon slot is available, each super frame including the beacon frame and a data frame,

wherein the empty beacon slot is confirmed to be available when, in each of the specified number of super frames after detection of the empty beacon slot and transmission of the first beacon:

- i) a fourth beacon transmitted by a fourth radio communication apparatus

programmed to move its beacon slot position is not received later than the first beacon slot within the beacon period and earlier than the end of the beacon period, and

ii) transmission of the fourth beacon from the fourth radio communication apparatus programmed to move its beacon slot position is not detected in a fifth beacon period occupancy information included in a fifth beacon transmitted by a fifth radio communication apparatus to have the fourth beacon later in the beacon period than the first radio communication apparatus;

wherein the first radio communication apparatus relocates its beacon slot position to the detected empty beacon slot, and notifies the beacon transmission command section of an update of the timing for the transmitting the first beacon; and

wherein a beacon transmission command section gives the frame forming section an updated timing for transmitting the generated first beacon, and the frame forming section outputs the generated first beacon to the radio processing section according to the updated timing.

35. (New) A radio communication apparatus by which the radio communication apparatus transmits a beacon within a beacon period so that the beacon does not conflict with other beacons transmitted within the beacon period from other radio communication apparatuses, said apparatus comprising:

a producing section that produces a beacon period occupancy information containing: first moving status information which was included in another beacon received from another radio communication apparatus, an identifier for specifying the another communication

apparatus which notified the first moving status information, and a beacon slot position which indicates a slot position of the another beacon within the beacon period;

a generating section that generates the beacon including the beacon period occupancy information and second moving status information to notify the other radio communication apparatuses about a request for moving of its own beacon slot position;

a transmitting section that transmits the generated beacon at the radio communication apparatus's beacon slot position;

a detecting section that detects whether there is at least one empty beacon slot located before the radio communication apparatus's beacon slot position within the beacon period;

a monitoring section that monitors a specified number of super frames to confirm that the empty beacon slot is available when an empty beacon slot is detected, each super frame including a beacon frame and a data frame,

wherein the empty beacon slot is confirmed to be available when, in each of the specified number of super frames:

i) a specific beacon transmitted from a specific radio communication apparatus programmed to move its beacon slot position is not received later than the radio communication apparatus's beacon slot position within the beacon period and earlier than the end of the beacon period, and

ii) the specific radio transmission apparatus programmed to move its beacon slot position is not detected in other beacon period occupancy information included in the other beacons transmitted from the other radio communication apparatuses to have the specific beacon later in the beacon period than the radio

communication apparatus; and

a moving section that moves the beacon slot to the empty beacon slot after the specified number of super frames, and transmits its beacon in the new beacon slot, when the empty beacon slot is confirmed to be available.

Allowable Subject Matter

4. Claims 1, 5, 12, 15-22 and 29-35 are allowed.

5. The following is an examiner's statement of reasons for allowance:

Consider claims 1, 29, 30, 31, 33 and 35, the prior arts of record of Salokannel et al. (US 20050249173 A1), in combination with Ho et al. (US 20060092909 A1), discloses transmitting beacons within a beacon period so that the beacon does not conflict with another beacons within the beacon period from other radio communication apparatus, comprising: a step of producing beacon period occupancy information containing: first moving status information which was included in another beacon received from another radio communication apparatus, an identifier for specifying the another radio communication apparatus which notified the first moving status information and a beacon slot position which indicates a slot position of the another beacon within the beacon period; a step of generating the beacon including the beacon period occupancy information and second moving status information to notify the other radio communication apparatuses about a request for moving its own slot position.

However, after the amendments to the claims and the new added claims, applicant's remarks have been considered and found to be persuasive. In agreement with the applicant's remarks, the prior arts of record failed to disclose wherein the empty beacon slot is confirmed to

be available when, in each of the specified number of super frames: **i)** a specific beacon transmitted from a specific radio communication apparatus programmed to move its beacon slot position is not received later than the radio communication apparatus's beacon slot position within the beacon period and earlier than the end of the beacon period, and **ii)** the specific radio transmission apparatus programmed to move its beacon slot position is not detected in other beacon period occupancy information included in the other beacons transmitted from the other radio communication apparatuses to have the specific beacon later in the beacon period than the radio communication apparatus; and a step of moving the beacon slot to the empty beacon slot after the specified number of super frames, and transmitting the beacon in the new beacon slot, when the empty beacon slot is confirmed to be available.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

6. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Marcos Batista, whose telephone number is (571) 270-5209. The Examiner can normally be reached on Monday-Thursday from 8:00am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Rafael Pérez-Gutiérrez can be reached at (571) 272-7915. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist/customer service whose telephone number is (571) 272-2600.

/Marcos Batista/
Examiner

/Rafael Pérez-Gutiérrez/
Supervisory Patent Examiner, Art Unit 2617

02/13/2009